

Fig.1

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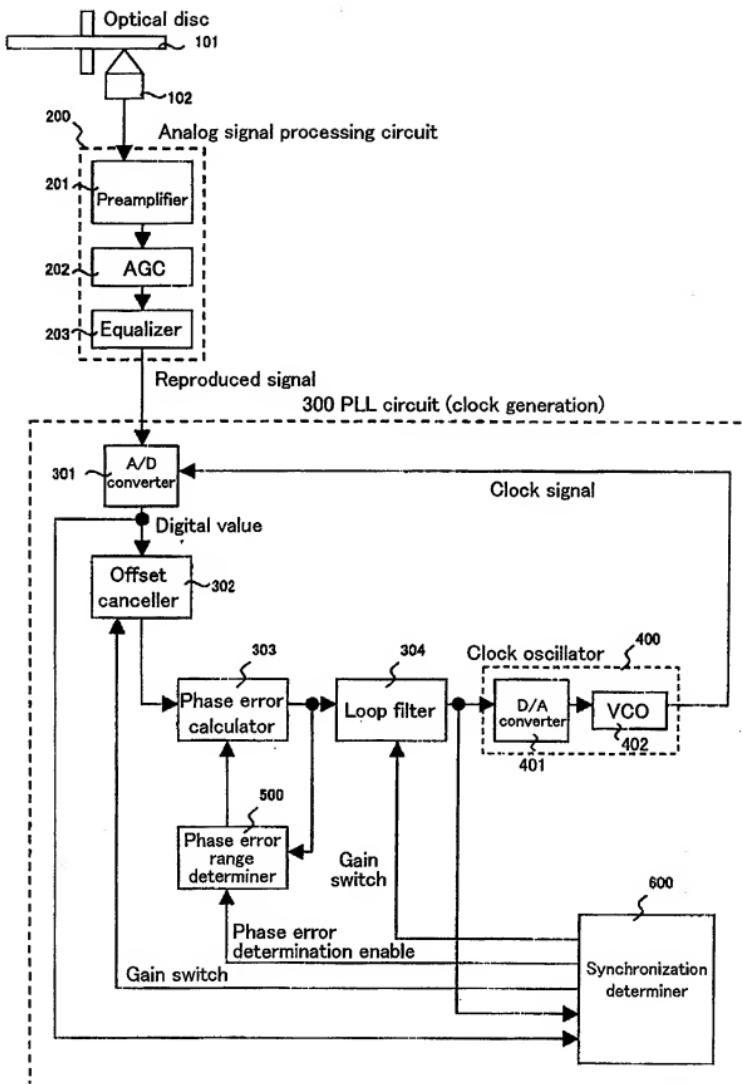


Fig.2

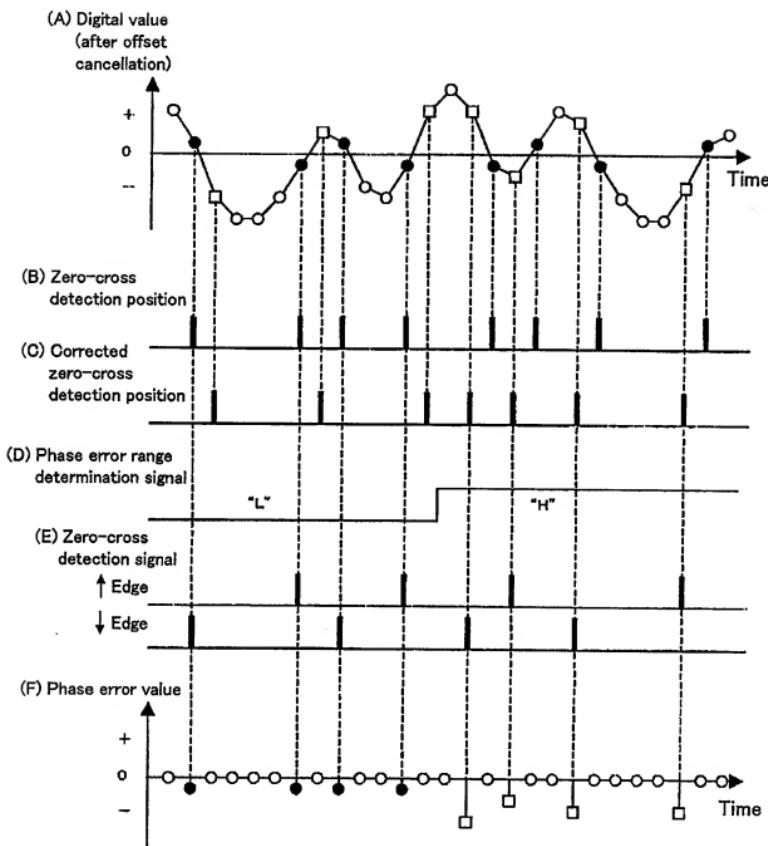


Fig.3

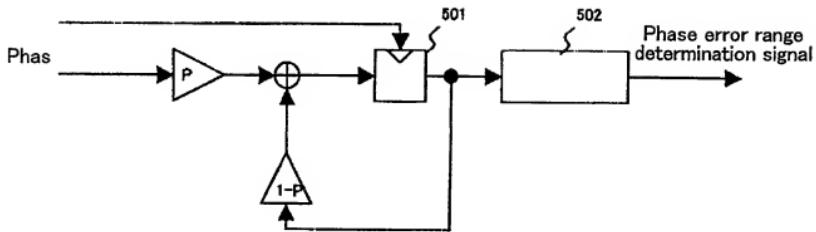
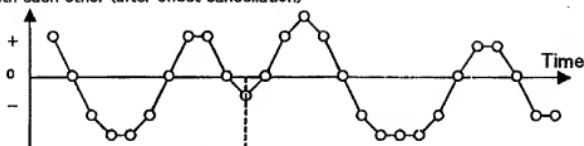
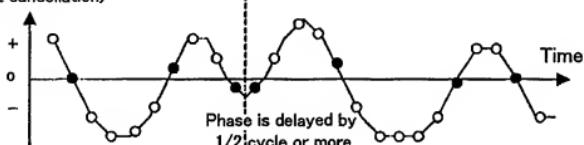


Fig.4

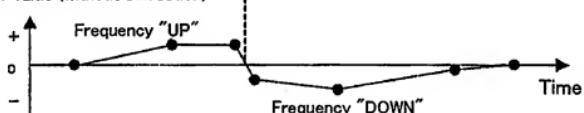
(A) Digital value in a case where the frequencies coincide with each other (after offset cancellation)



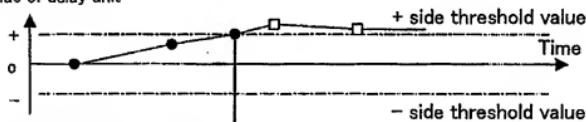
(B) Digital value in a case of low frequency
(after offset cancellation)



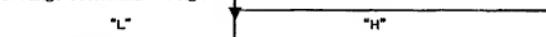
(C) Phase error value (without correction)



(D) Output value of delay unit



(E) Phase error range determination signal



(F) Phase error value (with correction)

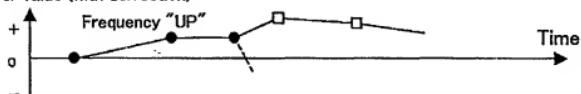


Fig.5

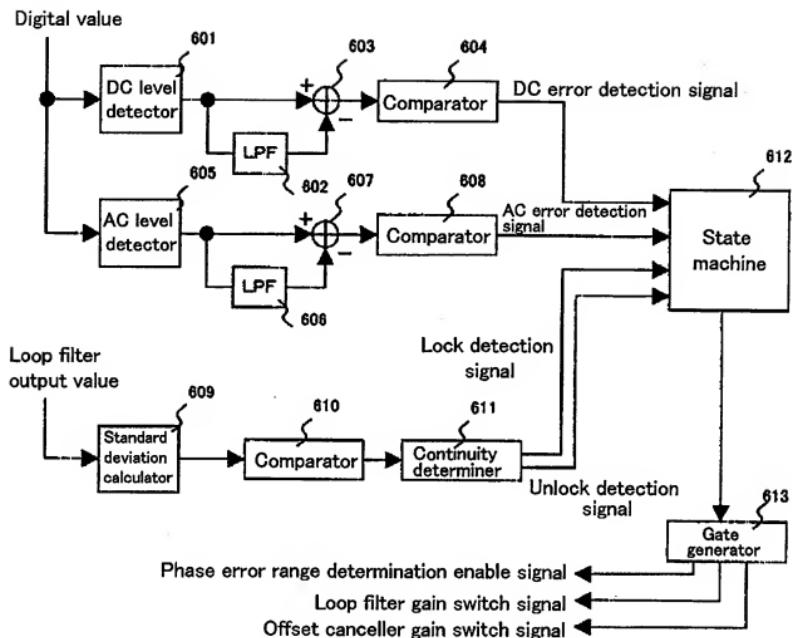


Fig.6

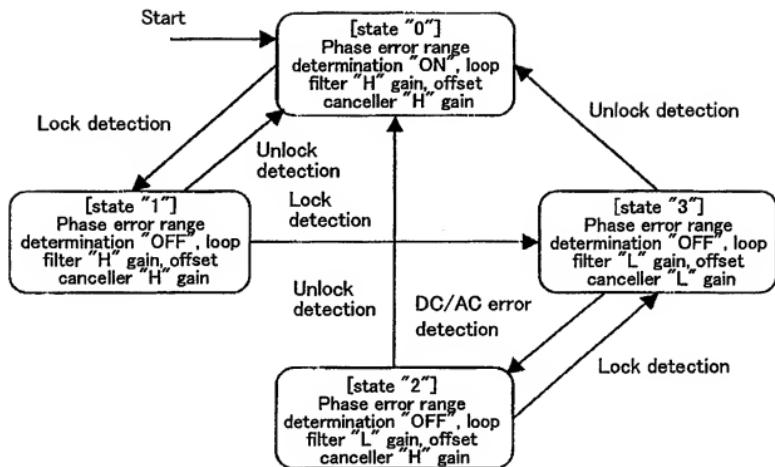


Fig.7

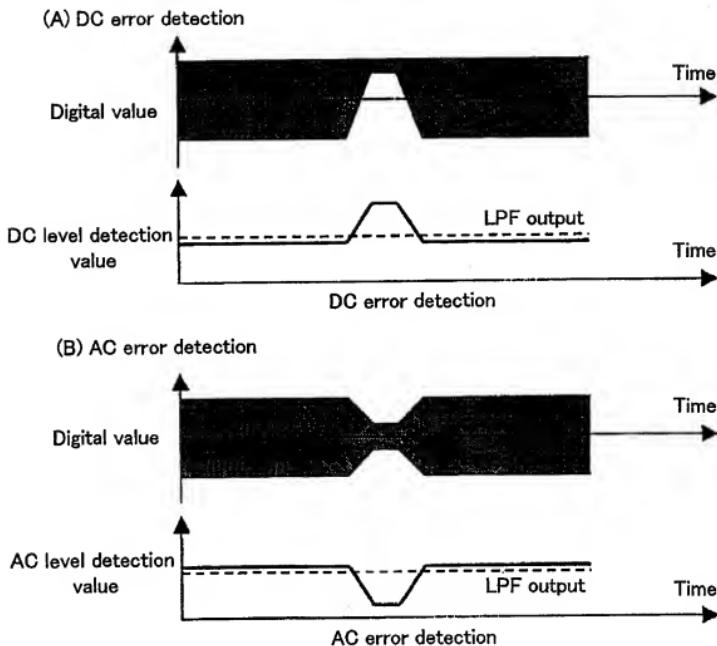


Fig.8

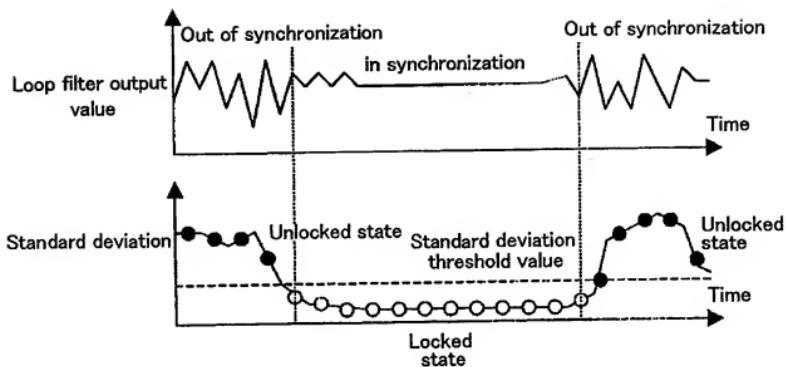


Fig.9

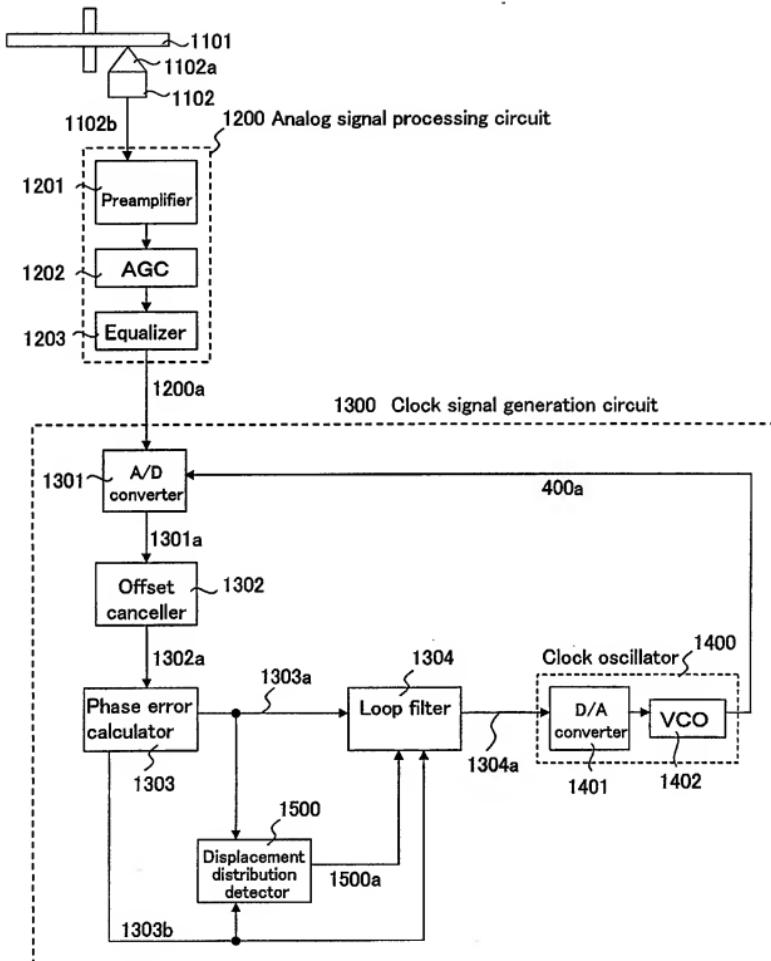


Fig.10

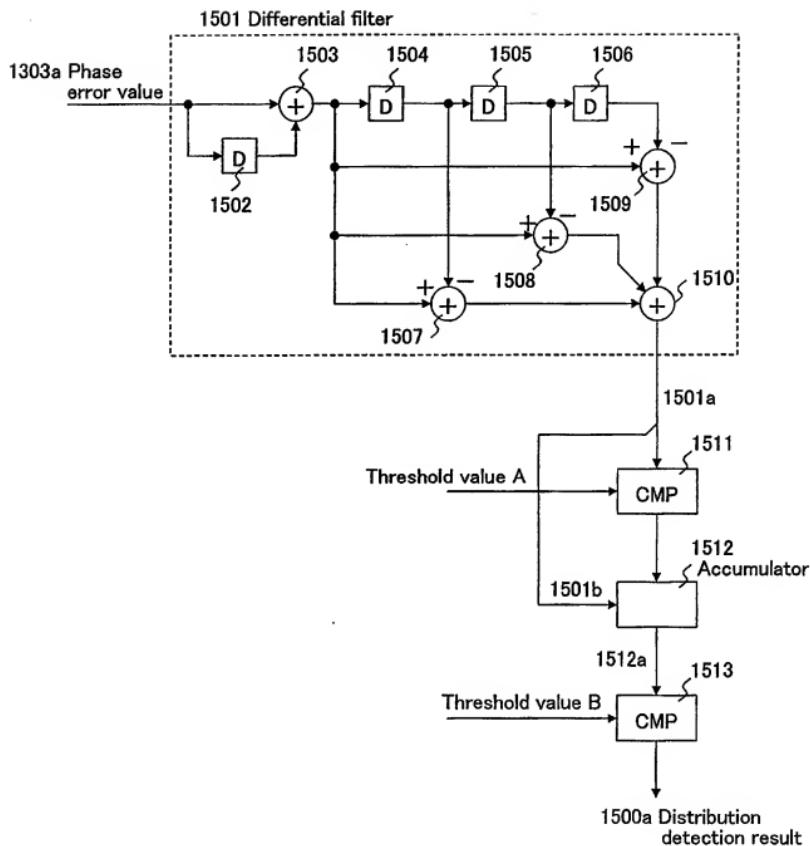
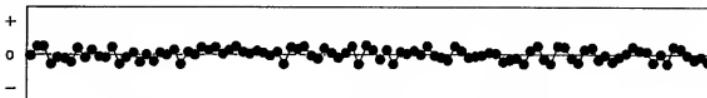
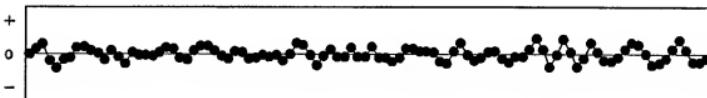


Fig.11

(A) Phase error value in a case where the frequencies coincide with each other



(B) Differential filter output value in a case where the frequencies coincide with each other



(C) Accumulated value of signs of differential filter output values in a case where the frequencies coincide with each other

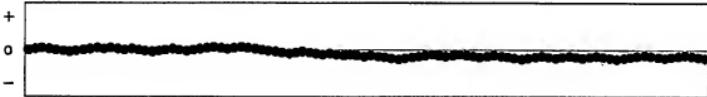
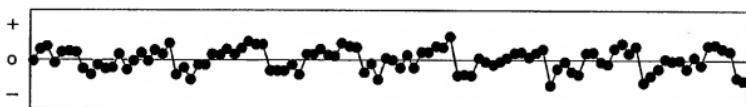
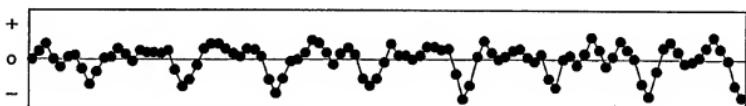
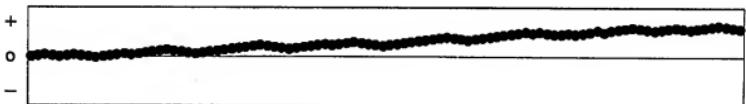


Fig.12

(A) Phase error value in a case of low frequency

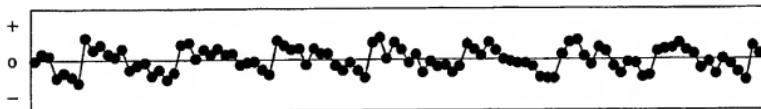


(B) Differential filter output value in a case of low frequency

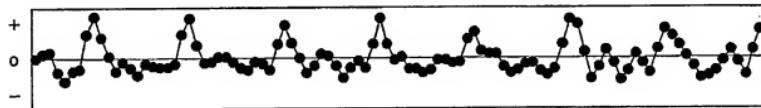
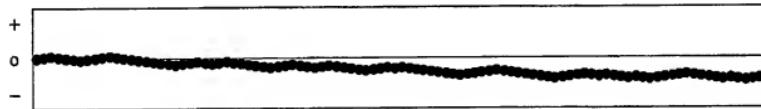
(C) Accumulated value of signs of differential filter output values
in a case of low frequency

Flid.13

(A) Phase error value in a case of high frequency



(B) Differential filter output value in a case of high frequency

(C) Accumulated value of signs of differential filter output values
in a case of high frequency

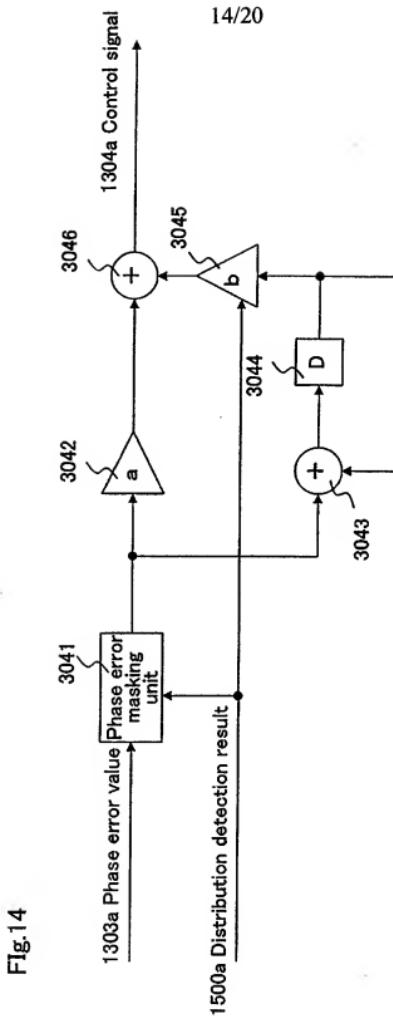
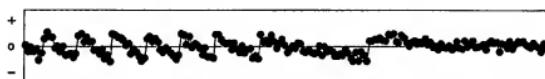


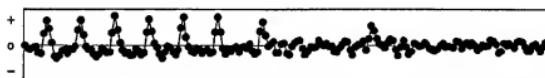
Fig.14

Fig.15

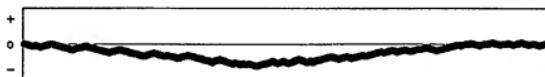
(A) Phase error value



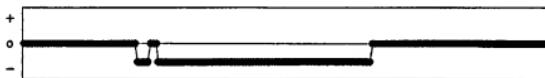
(B) Differential filter output value



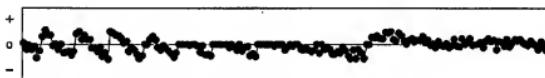
(C) Accumulated value of signs of differential filter output values



(D) Distribution detection result



(E) Phase error value after masking operation



(F) Control signal for clock frequency



Fig.16

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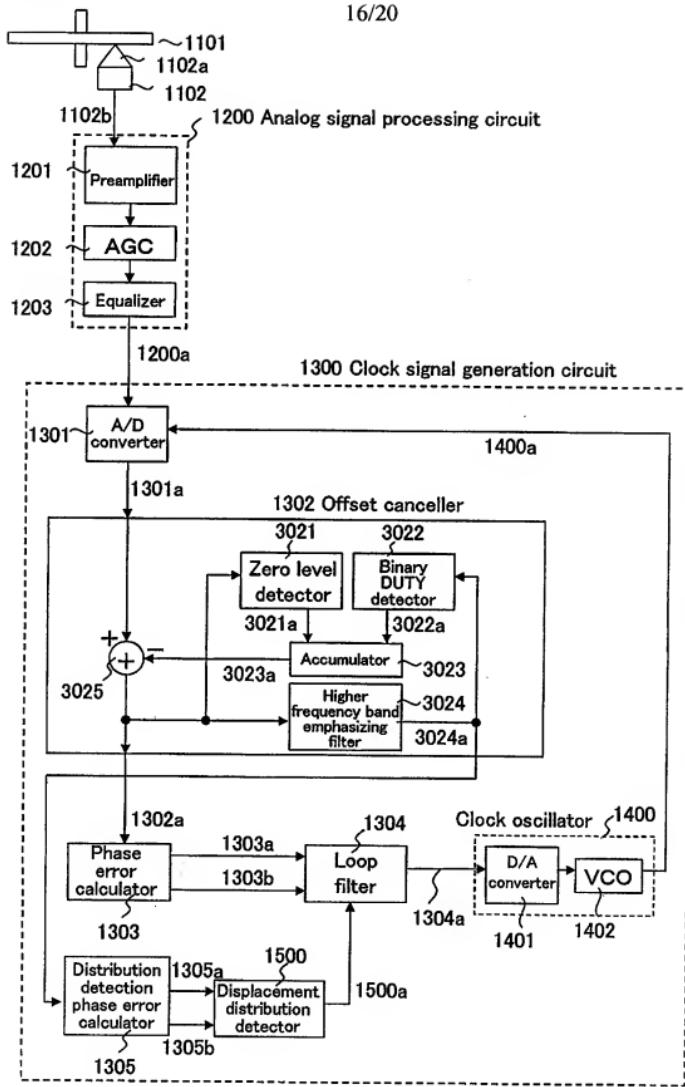


Fig.17

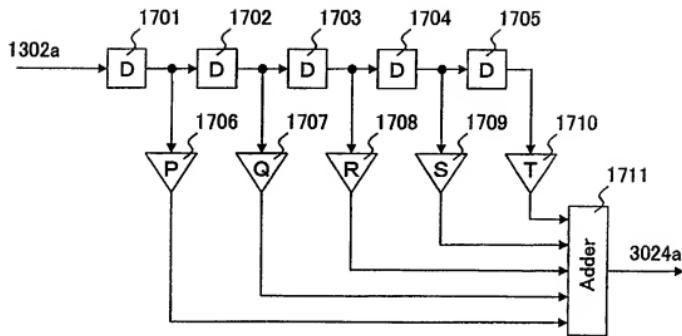


Fig.18

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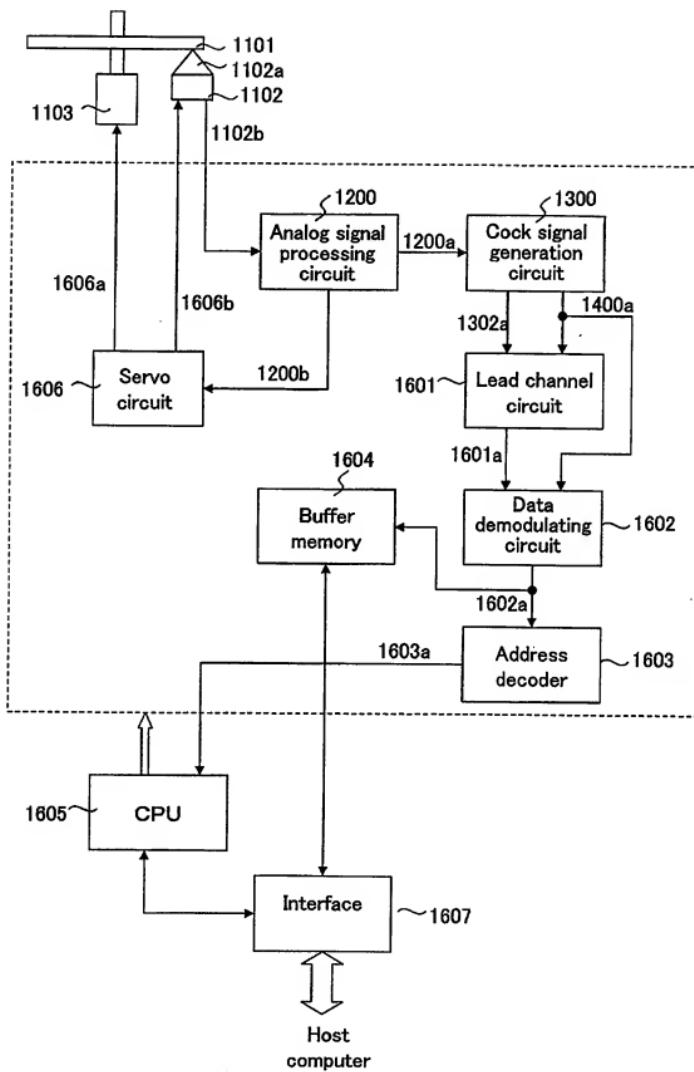


Fig.19

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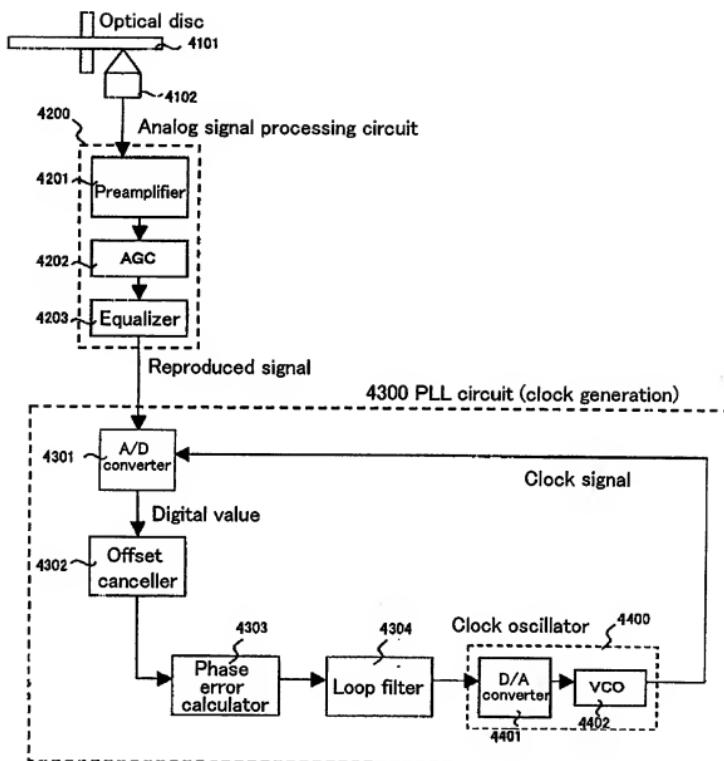
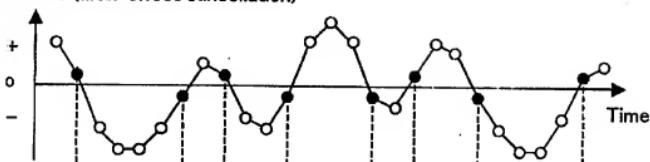


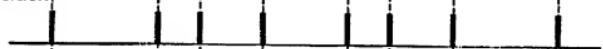
Fig. 20

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(A) Digital value (after offset cancellation)



(B) Zero-cross detection position



(C) Phase error value

